

HIFS VNL Monthly Progress Report Preparation for NDCX-II Project

Grant Logan - NDCX-II mission and constraints
Joe Kwan - Project overview, desired beam, acceptance goals, issues
John Barnard - Target physics for NDCX-II
Matthaeus Leitner - Project plan & engineering implications
Alex Friedman - Physics design
Joe Kwan - Ion source
[Visit B58 test stand, NDCX-I, future site of NDCX-II]
Erik Gilson - Neutralized drift line
Matthaeus Leitner - alignment and assembly
Will Waldron - Pulsed power and other EE
Frank Bieniosek - Beam diagnostics

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Preparation for NDCX-II Project

In preparation for the project and for anticipated review in August, the HIFS-VNL hosted an NDCX-II Advisory Meeting at LBNL on May 27, 2009. A number of experts in accelerator physics, engineering, and construction were asked to visit for a full day, listen to presentations on the project, its goals, and its status, and to offer their advice on how best to proceed, what topics needed attention, and what technical options seemed most attractive to them. This was a productive meeting, and the Committee's comments will provide useful guidance. The presentations, and the members of the Advisory Committee, were:

Presentations:

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[Advisory group discussion and presentation of advice]

Committee:

Roger Bangerter
Dick Briggs
George Caporaso
Yu-Jiuan Chen (cancelled due to illness)
Andy Faltens
Larry Grisham (via phone)
Ed Lee
Daniela Leitner
Lou Reginato
Joseph Rasson
John Staples
Simon Yu (via internet)

NDCX/WDM/Advanced Theory and Simulations

Eleven members of the HIFS-VNL attended the 2009 Particle Accelerator Conference in Vancouver, Canada, May 4-8, 2009. At the conference, members of the VNL presented three invited presentations on our recent advances in the NDCX experiment and theoretical and simulation studies:

1. Designing Neutralized Drift Compression for Focusing of Intense Beam Pulses in a Background Plasma, I. Kaganovich, R. Davidson, M. Dorf, E. Startsev, A. Sefkow, J. Barnard, A. Friedman, E. Lee, S. Lidia, B. G. Logan, P. Roy, P. Seidl, D. Welch
2. Progress in Beam Focusing and Compression for Target Heating and Warm Dense Matter Experiments, P. A. Seidl, A. Anders, F. M. Bieniosek, J. E. Coleman, J.-Y. Jung, M. Leitner, S. Lidia, B. G. Logan, P. Ni, D. Ogata, P. Roy, W. Waldron, J. Barnard, R. Cohen, D. Grote, E. Gilson, D. Welch
3. Application of the Reduction of Scale Range in a Lorentz Boosted Frame to the Numerical Simulation of Particle Acceleration Devices, J-L. Vay

In addition, members of HIFS-VNL presented the following 19 poster presentations to the international accelerator physics community:

1. Collective Instabilities and Beam-Plasma Interactions for an Intense Ion Beam Propagating through Background Plasma, R. Davidson, M. Dorf, I. Kaganovich, H. Qin, E. Startsev
2. Non-Commutative Courant-Snyder Theory for Coupled Transverse Dynamics of Charged Particles in Electromagnetic Focusing Lattices, H. Qin and R. Davidson
3. Generalized Kapchinskij-Vladimirskij solution for wobbling and tumbling beams in a solenoidal focusing lattice with transverse deflecting plates, H. Qin and R. Davidson
4. Calculation of Charge-Changing Cross Sections of Ions or Atoms Colliding with Fast Ions Using the Classical Trajectory Method, I. Kaganovich, R. Davidson, H. Mebane, A. Shnidman
5. Adiabatic Formation and Properties of a Quasi-Equilibrium Beam Distribution Matched to a Periodic Focusing Lattice, M. Dorf, R. Davidson, H. Qin, E. Startsev
6. Approximate Matched Solution of Intense Charged Particle Beam Propagating through Periodic Quadrupole Focusing Lattice, E. Startsev, R. Davidson, M. Dorf

7. Studies of the Behavior of Modified-Distribution-Function Beams on the Princeton Paul Trap Simulator Experiment, E. P. Gilson, R. C. Davidson, M. Dorf, P. Efthimion, R. Majeski, E. Startsev, H. Wang, A. Arora, M. Chung, N. Thomas
8. Development of a Li⁺ Alumino-Silicate Ion Source, P. Roy, A. Anders, W. Greenway, J. Kwan, S. Lidia, P. Seidl, W. Waldron
9. Commissioning Results of the Upgraded Neutralized Drift Compression Experiment, S. Lidia, P. Roy, P. Seidl, W. Waldron, E. Gilson
10. Fast Correction Optics to Reduce Chromatic Aberrations in Longitudinally Compressed Ion Beams, S. Lidia, E. Lee, D. Ogata, P. Seidl, S. Lund
11. Multi-Meter-Long Plasma Source for Heavy Ion Beam Charge Neutralization, P. Efthimion, R. Davidson, E. Gilson, B. G. Logan, P. Seidl, W. Waldron
12. A statistical study of beam centroid oscillations in a solenoid transport channel, S. M. Lund, J. Coleman, P. Seidl, C. Wootton
13. Application of the Adaptive Mesh Refinement Technique to Particle-in-Cell Simulations of Beams and Plasmas, J-L. Vay, C. Geddes, A. Friedman, D. Grote
14. Simulation of a Feedback System for the Attenuation of E-Cloud Driven Instability, J-L. Vay, J. Byrd, M. Furman, M. Venturi, J. Fox
15. Update on Electron-Cloud Simulations Using the Package WARP-POSINST, J-L Vay, C. Celata, M. Furman, M. Venturini, K. Sonnad
16. Full Electromagnetic Simulation of Free-Electron Laser Amplifier Physics via the Lorentz-Boosted Frame Approach, W. Fawley, J-L Vay
17. Investigation of Single Bunch Instabilities due to Electron Cloud Effects, K. Sonnad, G. Rumolo, F. Zimmermann, G. Franchetti, K. Ohmi, M. Furman, J-L Vay, M. Pivi, T. Raubenheimer
18. Cyclotron Resonances in Electron Cloud Dynamics, C. Celata, M. Furman, J-L. Vay, D. P. Grote, J. Ng, M. Pivi, L. Wang
19. Simulating an acceleration schedule for NDCX II, W.M. Sharp, A. Friedman, D.P. Grote, E. Henestroza, M. Leitner, W. Waldron